CLAIMS

1.   A steel sheet for vitreous enameling excellent in workability, aging properties and enameling properties, said steel sheet containing, in mass,

C: 0.0050% or less,

Si: 0.50% or less,

Mn: 0.005 to 1.0%,

P: $10 \times (B - 11/14 \times N)$ to 0.10%,

S: 0.080% or less,

Al: 0.050% or less,

N: 0.0005 to 0.020%,

B: $0.60 \times N$ to 0.020%, and

O: 0.002 to 0.0800%.

2.   A steel sheet for vitreous enameling excellent in workability, aging properties and enameling properties, said steel sheet containing, in mass,

C: 0.0025% or less,

Si: 0.050% or less,

Mn: 0.10 to 0.50%,

P: $10 \times (B - 11/14 \times N)$ to 0.030%,

S: 0.030% or less,

Al: 0.010% or less,

N: 0.0035 to 0.0060%,

B: $0.60 \times N$ to 0.0060%, and

O: 0.005 to 0.0450%.

3.   A steel sheet for vitreous enameling excellent in workability, aging properties and enameling properties, said steel sheet containing, in mass,

C: 0.0025% or less,

Si: 0.050% or less,

Mn: 0.10 to 0.50%,

P: $10 \times (B - 11/14 \times N)$ to 0.030%,

S: 0.030% or less,

Al: 0.010% or less,

N: 0.0005 to 0.0033%,

B: $0.60 \times N$ to $0.90 \times N$%, and

O: 0.005 to 0.0450%.

4.   A steel sheet for vitreous enameling excellent in workability, aging properties and enameling properties according to any one of claims 1 to 3, said steel sheet further containing one or more of Nb, V, Ti, Ni, Cr, Se, As, Ta, W, Mo and Sn at 0.030 mass percent or less in total.

5.   A steel sheet for vitreous enameling excellent in workability, aging properties and enameling properties according to any one of claims 1 to 4, said steel sheet satisfying the following expression:

(the amount of N existing as BN)/(the amount of N existing as AlN) $\geqq$ 10.0.

6.   A steel sheet for vitreous enameling excellent in workability, aging properties and enameling properties according to any one of claims 1 to 5, said steel sheet satisfying the following expression:

(the amount of N existing as BN)/(N content) $\geqq$ 0.50.

7.   A steel sheet for vitreous enameling excellent in workability, aging properties and enameling properties according to any one of claims 1 to 6, characterized by:

the steel sheet containing simple or compound nitrides, that contain B or Al, 0.02 to 0.50 μm in diameter;

the average diameter of said nitrides being 0.080 μm or larger; and

the proportion of the number of the nitrides 0.050 μm or smaller in diameter to the total number of said nitrides being 10% or less.

8.   A method for producing a steel sheet for vitreous enameling excellent in workability, aging properties and enameling properties, characterized by:

retaining a slab containing the components according to any one of claims 1 to 4 in the temperature range from 900 to 1,100°C (Retained Temperature Range 1)

for 300 min. or longer before commencing hot rolling;

thereafter retaining it in a temperature range not less than 50°C higher than said retained temperature (Retained Temperature Range 2) for 10 to 30

5   min.;

then cooling it to a temperature range not less than 50°C lower than said retained temperature (Retained Temperature Range 3) at a cooling rate of 2°C/sec. or less;

10   retaining it in said Retained Temperature Range 3 for 10 min. or longer; and
thereafter commencing hot rolling.

9.   A method for producing a steel sheet for vitreous enameling excellent in workability, aging

15   properties and enameling properties according to claim 8, characterized by further controlling the time period from the time when the coiling of a hot-rolled steel sheet terminates at a temperature of 700 to 750°C in a hot-rolling process to the time when the temperature of said

20   steel sheet reaches 550°C or lower to 20 min. or longer.

10.   A method for producing a steel sheet for vitreous enameling excellent in workability, aging properties and enameling properties according to claim 8 or 9, characterized by:

25   commencing hot rolling;

after the reduction ratio reaches 50% or more, retaining the hot-rolled material in the temperature range from 900 to 1,200°C for 2 min. or longer with the temperature of said material not lowered

30   to 900°C or lower; and

thereafter commencing the hot rolling again.